DIRECT OBSERVATION OF b_2 VIBRATIONAL LEVELS IN THE $^1B_2$ $\tilde{C}$ STATE OF SO_2: PRECISE MEASUREMENT OF ν_3 LEVEL STAGGERINGS

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The $^1B_2$ $\tilde{C}$ STATE OF SO_2 has been the subject of extensive investigation because it is important in the atmospheric photodissociation of SO_2. The state has a double-minimum potential in the dissociation coordinate, ν_3, arising from vibronic interactions, leading to a staggering of vibrational levels with v_3 odd vs. even. We report the first direct observations of the v_3 fundamental and of other levels with b_2 vibrational symmetry (odd v_3). Our work has made use of LIF, IR-UV double resonance, and coherent MODR techniques. Implications of the precision measurement of v_3 staggerings to the determination of double-minimum potential barrier and to vibronic coupling will be discussed.